



Docket No. 8734.274  
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:  
Woong Kwon KIM et al.

Customer No. 30827

Application No. 10/736,620

Confirmation No. 4079

Filed: December 17, 2003

Art Unit: 1752

For: METHOD FOR FABRICATING ARRAY  
SUBSTRATE HAVING COLOR FILTER ON  
THIN FILM TRANSISTOR STRUCTURE FOR  
LIQUID CRYSTAL DISPLAY DEVICE

Examiner: Richard L. Schilling

**MS Appeal Brief – Patents**  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**APPEAL BRIEF**

Sir:

In response to a Final Rejection of all pending claims that was mailed on November 10, 2005 and an Advisory Action that was mailed on February 22, 2006, and in support of a “Notice of Appeal” filed March 9, 2006, Appellants hereby submit this Appeal Brief.

The fees required under § 1.17(f) and any required petition for extension of time for filing this brief and fees therefore are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37(c):

**I. Real Party In Interest**

**II. Related Appeals and Interferences**

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**III. Status of Claims**

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**IV. Status of Amendments**

**V. Summary of Claimed Subject Matter**

**VI. Grounds of Rejection to be Reviewed on Appeal**

**VII. Argument**

**Claims Appendix**

**Evidence Appendix**

**Related Proceedings Appendix**

**I. REAL PARTY IN INTEREST**

The real party in interest for this appeal is: LG.PHILIPS LCD CO., LTD.

**II. RELATED APPEALS AND INTERFERENCES**

There are no other appeals or interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

**III. STATUS OF CLAIMS**

**Total Number of Claims in the Application**

There are 34 claims pending in the application.

**Current Status of Claims**

Claims canceled: None.

Claims withdrawn from consideration but not canceled: None.

Claims pending: 1-34.

Claims allowed: None.

Claims rejected: 1-34.

Claims on Appeal: The claims on appeal are claims 1-34.

#### **IV. STATUS OF AMENDMENTS**

The Examiner issued a Final Rejection on November 10, 2005 and an Advisory Action on February 22, 2006. No amendment has been filed in response to this Final Rejection or Advisory action. Accordingly, the claims enclosed herein in the Claims Appendix reflect the current status of claims 1-34.

#### **V. SUMMARY OF CLAIMED SUBJECT MATTER**

The present invention is related to a method of fabricating a liquid crystal display device. A gate line and a data line crossing each other and defining a pixel region is formed. (Para. 0036 and Fig. 3.) Next, a thin film transistor at each intersection of the gate and data lines is formed, wherein the thin film transistor includes a gate electrode, an active layer, a source electrode, and a drain electrode. (Para. 0036 and Fig. 3.) Then, a first insulating layer to cover the thin film transistor and the data line is formed. (Para. 0041 and Fig. 4A.) A black matrix on the first insulating layer is formed, except for a portion of the drain electrode. (Para. 0044 and Fig. 4C.) A second insulating layer is formed on the first insulating layer to cover the black matrix. (Para. 0043 and Fig. 4B.) Next, the first and second insulating layers are patterned to expose a portion of the drain electrode. (Para. 0047 and Fig. 4F.) A first transparent electrode layer is formed over a surface of the substrate to cover the patterned second insulating layer and the exposed portion of the drain electrode. (Para. 0048 and Fig. 4G.) Then, the first transparent electrode layer is patterned to form a pixel electrode in the pixel region, wherein the pixel electrode contacts the exposed portion of the drain electrode. (Para. 0048 and Fig. 4G.) A color filter is formed on the pixel electrode. (Para. 0048 and Fig. 4G.) A second transparent electrode layer is formed over a surface of the substrate to cover the color filter and the pixel electrode, wherein the second transparent electrode is in an amorphous state. (Para. 0049 and Fig. 4H.) A light irradiates a portion of the second transparent electrode layer corresponding to the pixel region so as to crystallize the irradiated portion of the second transparent electrode. (Para. 0049 and Fig. 4H.) A second pixel electrode is formed in the pixel region by removing a non-crystallized portion of the second transparent electrode layer, wherein the second pixel electrode contacts the first pixel electrode over the black matrix. (Para. 0050 and Fig. 4I.)

**VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

The Examiner rejected claims 1-34 under 35 U.S.C. § 112, first paragraph, as being broader than the enabling disclosure. Claims 1-34 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,873,382 to Chang et al. (hereinafter "Chang") in view of U.S. Patent No. 6,448,158 to Peng et al. (hereinafter "Peng").

**VII. ARGUMENT**

- A. The Examiner improperly rejected claims 1-34 U.S.C. § 103(a) as being allegedly unpatentable over the Chang in view of Peng.

The rejection under 35 U.S.C. 112 as being broader than the enabling disclosure is respectfully traversed and reconsideration is requested. The Examiner states:

The enabling disclosure is limited to using amorphous indium tin oxide (ITO) or indium zinc oxide as the amorphous material which is crystallized by exposure to light and is also limited to using oxalic acid in an etching step to remove the indium tin oxide for indium zinc oxide in the amorphous state which is not crystallized by light exposure. It is also not well known in the art what other amorphous materials may be used and what other etching solutions may be used which form crystalline materials on exposure to light, are transparent and conductive for using in liquid crystal displays and which may be removed without removing crystallized forms thereof. Peng et al. shows that a method of exposing ITO amorphous layers to light to form crystalline areas with removal of non-exposed areas by oxalic acid as disclosed in applicants' specification is not one of the many obvious methods of carrying out the steps of patterning the second electrode of the instant claims but rather is a non-obvious patentable method.

The Examiner here is attempting to read specific examples from the specification into the claims. Applicants have provided two examples of materials that are encompassed in the disputed claim features. Applicants are entitled to all such materials that would be obvious to those of skill in the art that fall within the scope of the features claimed. The Examiner cites Peng et al. to argue that one of the examples in the Applicants' disclosure was not obvious because it was subject of an issued patent. At best, that means the specific example cited was not obvious. That in no way proves that no other such materials exist and that they are not well known to those of skill in the art. Further, not every possible embodiment of the invention is

required to be disclosed by the Applicants, otherwise every claim limitation would include long laundry lists of obvious items. When interpreting claims, it is not permissible to read in limitations or specific embodiments from the specification, but this appears to be exactly what the Examiner is attempting to do. Therefore, Applicants respectfully request withdrawal of the rejection under 35 U.S.C. 112.

- B. Claims 1-34 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Chang in view of Peng.


The present invention is assigned to LG.Philips LCD Co., Ltd., which assignment is recorded at reel 14816, frame 789. Chang is also assigned to LG.Philips LCD Co., Ltd., which assignment is recorded at reel 14004, frame 421. The present invention and Chang at the time the invention was made was subject to an obligation of assignment to LG.Philips LCD Co., Ltd. Therefore, under 35 U.S.C. § 103(c), Chang cannot be applied as prior art against claims 1, 10-13, and 26-28. Therefore, as Peng by itself is insufficient to reject claims 1-34, Applicants respectfully submit that claims 1-34 are allowable over the cited art.

A copy of the claims involved in the present appeal is attached hereto in the Claims Appendix.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. § 1.136, and any additional fees required under 37 C.F.R. § 1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 50-0911. Please credit any overpayment to deposit Account No. 50-0911. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

Dated: October 10, 2006

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**CLAIMS APPENDIX**

**Claims Involved In The Appeal Of Application No. 10/736,620:**

1. A method of fabricating a liquid crystal display device, comprising:  
forming a gate line and a data line crossing each other and defining a pixel region;  
forming a thin film transistor at each intersection of the gate and data lines, wherein the thin film transistor includes a gate electrode, an active layer, a source electrode, and a drain electrode;  
forming a first insulating layer to cover the thin film transistor and the data line;  
forming a black matrix on the first insulating layer, except for a portion of the drain electrode;  
forming a second insulating layer on the first insulating layer to cover the black matrix;  
patterning the first and second insulating layers to expose a portion of the drain electrode;  
forming a first transparent electrode layer over a surface of the substrate to cover the patterned second insulating layer and the exposed portion of the drain electrode;  
patterning the first transparent electrode layer to form a pixel electrode in the pixel region, wherein the pixel electrode contacts the exposed portion of the drain electrode;  
forming a color filter on the pixel electrode;  
forming a second transparent electrode layer over a surface of the substrate to cover the color filter and the pixel electrode, wherein the second transparent electrode is in an amorphous state;  
irradiating a light to a portion of the second transparent electrode layer corresponding to the pixel region so as to crystallize the irradiated portion of the second transparent electrode; and  
forming a second pixel electrode in the pixel region by removing a non-crystallized portion of the second transparent electrode layer, wherein the second pixel electrode contacts the first pixel electrode over the black matrix.
2. The method according to claim 1, further comprising forming a gate insulation layer to cover the gate line and the gate electrode.
3. The method according to claim 1, wherein the gate insulation layer is disposed between the active layer and the gate electrode.

4. The method according to claim 1, wherein the thin film transistor comprises an ohmic contact layer between the active layer and the source and drain electrodes.

5. The method according to claim 1, wherein the black matrix is formed of a black resin.

6. The method according to claim 1, wherein the black matrix is formed of an opaque photosensitive organic material.

7. (Original) The method according to claim 1, further comprising forming a storage capacitor over a portion of the gate line.

8. The method according to claim 1, wherein forming the storage capacitor comprises forming a storage metal layer over the portion of the gate line, so that the storage capacitor acts as a first electrode of the storage capacitor and the portion of the gate line acts as a second electrode of the storage capacitor.

9. The method according to claim 8, wherein the storage metal layer is electrically connected with the first pixel electrode.

10. The method according to claim 1, wherein the first and second insulating layers are formed of an inorganic material.

11. The method according to claim 10, wherein the inorganic material is formed of one of silicon oxide and silicon nitride.

12. The method according to claim 1, wherein the color filter is formed of a color resin.

13. The method according to claim 1, wherein the forming the second pixel electrode comprises applying oxalic acid  $[(\text{COOH})_2 \cdot \text{H}_2\text{O} + \text{H}_2\text{O}]$  to the partially irradiated second transparent electrode layer.

14. The method according to claim 1, wherein the light comprises one of a laser and a UV source.

15. The method according to claim 14, wherein the laser is a KrF excimer laser.

16. A method of fabricating a liquid crystal display device, comprising:  
forming a gate line in a first direction and a gate electrode extending from the gate line over a substrate;  
forming an active layer, an ohmic contact layer, a data line, a source electrode, and a drain electrode by using a same mask, wherein the data line and the gate line cross each other over the substrate and define a pixel region, the source electrode extends from the data line, the source and drain electrodes contact the ohmic contact layer, thereby forming a thin film transistor at each intersection of the gate and data lines;  
forming a first insulating layer to cover the thin film transistor and the data line;  
forming a black matrix on the first insulating layer, except for a portion of the drain electrode;  
forming a second insulating layer on the first insulating layer to cover the black matrix;  
patterning the first and second insulating layers to expose a portion of the drain electrode;  
forming a first transparent electrode layer over a surface of the substrate to cover the patterned second insulating layer and the exposed portion of the drain electrode;  
patterning the first transparent electrode layer to form a pixel electrode in the pixel region, wherein the pixel electrode contacts the exposed portion of the drain electrode;  
forming a color filter on the pixel electrode;  
forming a second transparent electrode layer over a surface of the substrate to cover the color filter and the pixel electrode, wherein the second transparent electrode is in an amorphous state;  
irradiating a light to a portion of the second transparent electrode layer corresponding to the pixel region so as to crystallize the irradiated portion of the second transparent electrode; and



forming a second pixel electrode in the pixel region by removing a non-crystallized portion of the second transparent electrode layer, wherein the second pixel electrode contacts the first pixel electrode around the color filter.

17. The method according to claim 16, wherein the mask comprises a transmitting portion where the light fully passes through, a shielding portion where the light is thoroughly blocked, and a half-transmitting portion where only a half portion of the light passes through.

18. The method according to claim 17, wherein the transmitting portion corresponds to the pixel region, except for a portion for the thin film transistor, the shielding portion corresponds to the data line and the thin film transistor, and the half-transmitting portion corresponds to the gate electrode.

19. The method according to claim 18, wherein the half-transmitting portion is one of a plurality of slits and a semitransparent film.

20. The method according to claim 18, wherein the active layer is an intrinsic amorphous silicon, and the ohmic contact layer is a doped amorphous silicon.

21. The method according to claim 16, further comprising forming a gate insulation layer to cover the gate line and the gate electrode.

22. The method according to claim 16, wherein a gate insulation layer is disposed between the active layer and the gate electrode.

23. The method according to claim 16, wherein the ohmic contact layer is disposed between the active layer and the source and drain electrodes.

24. The method according to claim 16, wherein the black matrix is formed of a black resin.

25. The method according to claim 16, wherein the black matrix is formed of an opaque photosensitive organic material.

26. The method according to claim 16, further comprising forming a storage capacitor over a portion of the gate line.

27. The method according to claim 16, wherein forming the storage capacitor includes forming a storage metal layer over the portion of the gate line, so that the storage capacitor acts as a first electrode of the storage capacitor and the portion of the gate line acts as a second electrode of the storage capacitor.

28. The method according to claim 27, wherein the storage metal layer is electrically connected with the first pixel electrode.

29. The method according to claim 16, wherein the first and second insulating layers are formed of an inorganic material.

30. The method according to claim 29, wherein the inorganic material is formed of one of silicon oxide and silicon nitride.

31. The method according to claim 16, wherein the color filter is formed of a color resin.

32. The method according to claim 16, wherein forming the second pixel electrode comprises applying oxalic acid  $[(\text{COOH})_2 \cdot \text{H}_2\text{O} + \text{H}_2\text{O}]$  to the partially irradiated second transparent electrode layer.

33. The method according to claim 16, wherein the light comprises one of a laser and a UV source.

34. The method according to claim 33, wherein the laser is a KrF excimer laser.

**EVIDENCE APPENDIX**

**Evidence:**

None.

**RELATED PROCEEDINGS APPENDIX**

**Related Proceedings:**

None.